

Handwritten: #4 and B

Docket Number 100788.0012US1



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
WASHINGTON, D.C. 20231

RECEIVED  
MAY 29 2002  
TECH CENTER 1600/2900

Inventor: **Kureshy, Fareed**  
Serial No: **09/735,402**  
Filed: **December 12, 2000**  
For: **Stage and Platform for  
building a Biochip, and  
Biochip**

Examiner: **B.J. Forman**  
Art Unit: **1623**

**RESPONSE TO OFFICE ACTION**

The Honorable Commissioner  
of Patents and Trademarks  
Washington, D.C. 20231

Dear Sir:

This paper responds to the Office Action dated February 22, 2002. Please enter the following:

**IN THE CLAIMS**

Please cancel claims 1-55 and add the following claims:

56. A biochip comprising:
- a carrier coupled to a multi-functional matrix layer that is coupled to a sensing element, wherein the a multi-functional matrix layer provides reduction of at least one of an autofluorescence of the carrier, an incident-light-absorption of the carrier, and a surface unevenness of the carrier; and
- wherein the sensing element binds to an analyte that is disposed in a sample fluid when the sample fluid contacts the biochip.

Handwritten: B1

57. The biochip of claim 56 wherein the carrier comprises an organic polymer or an inorganic polymer.
58. The biochip of claim 57 wherein the organic polymer is selected from the group consisting of a polyethylene, a polyester, and a polystyrene.
59. The biochip of claim 56 further comprising a hydrophilic interposed layer between the carrier and the multi-functional matrix layer.
60. The biochip of claim 56 wherein the multi-functional matrix layer comprises an aqueous solvent.
61. The biochip of claim 60 wherein the multi-functional matrix layer comprises a material selected from the group consisting of an agarose, a polyacrylamide, and a gelatin.
62. The biochip of claim 56 further comprising a second multi-functional matrix layer wherein the second multi-functional matrix layer is coupled to the multi-functional matrix layer and provides reduction of at least one of an autofluorescence of the carrier, an incident-light-absorption of the carrier, and a surface unevenness of the carrier.
63. The biochip of claim 56 wherein the sensing element comprises at least one of a polypeptide and a polynucleotide.
64. The biochip of claim 56 wherein the sensing element is at least partially embedded within the multi-functional matrix layer.
65. The biochip of claim 56 wherein the sensing element is coupled to the multi-functional matrix layer via a cross linking agent.
66. The biochip of claim 65 wherein the cross linking agent comprises a first portion that is coupled to the matrix layer and a second portion that is coupled to the sensing element, and wherein the first and second portions form a non-covalent bond with each other.

67. The biochip of claim 66 wherein the first portion comprises avidin or streptavidin, and wherein the second portion comprises biotin.
68. The biochip of claim 56 wherein the analyte is selected from the group consisting of a receptor, an enzyme, a oligonucleotide, a polynucleotide, a toxin, a venom, an antibody, an oligosaccharide, and a viral epitope.
69. The biochip of claim 68 wherein the sample fluid comprises a cell, a subcellular component, a component from a plant, a component from a virus, or a component from a microorganism.
70. The biochip of claim 56, wherein the multi-functional matrix layer comprises at least one of a surfactant, a humectant, a buffer, and a light blocking agent.
71. The biochip of claim 56 further comprising a second multi-functional matrix layer, wherein at least one of the multi-functional matrix layer and the second multi-functional matrix layer comprises at least one of a surfactant, a humectant, a buffer, and a light blocking agent.

### IN THE SPECIFICATION

Please amend as follows:

Page 5, last sentence beginning at line 22: --According to the conditions of the detection method, the binding of the analyte to the sensing element yields a colorimetric even (e.g., fluorescence, phosphorescence) that is, a signal, which, when processed or monitored by an optical reader indicates the presence of an analyte of interest in the target sample.--

Page 19, the sentence beginning at line 6: --In colorimetric-event detection, and in particular fluorescence-detection methods, a fluorescent molecule has the ability to absorb photons of energy at one wavelength and subsequently emit the energy at another wavelength.--

Page 20, the sentence beginning at line 18: --A "reporter probe" refers to a labeled molecule that yields a colorimetric event upon exposure to excitation energies.

B<sub>4</sub> Page 21, the sentence beginning at line 5: --Since each marker has its own colorimetric character, more than one molecule, each tagged with a different marker can be used at the same time to detect two or more analytes of interest.--

B<sub>5</sub> Page 35, the two sentences beginning at line 17: --The reporter probe (75) will react, combine, or otherwise bind to an analyte (85) of interest, thereby causing a colorimetric effect upon exposure to excitation energy. This colorimetric effect indicates the presence of the analyte of interest (85).--

B<sub>6</sub> Page 40, the sentence beginning at line 5: --This experiment was performed to show that a fluorescently labeled sensing element produces a detectable colorimetric effect (e.g., fluorescence) when bound to the top surface of the platform.--

B<sub>7</sub> Page 40, the sentence beginning at line 13: --This experiment was performed to show that an unlabeled sensing element bound to the surface of the matrix does not produce a colorimetric effect.--

B<sub>8</sub> Page 40, the sentence beginning at line 19: --This experiment was performed to show that a fluorescently labeled analyte (e.g., nucleic acid) that hybridizes to a sensing element bound to the surface of the matrix produces a colorimetric effect.--

B<sub>9</sub> Page 41, the sentence beginning at line 7: --This experiment was performed to show that unlabeled nucleic acid sensing elements spotted onto the surface of the matrix do not produce a colorimetric effect.--

## REMARKS

### Specification Objections

The objections to the specification set forth by examiner on page 2 of the Office Action have been corrected by cancellation of the replacements of the term "luminescent" with the term "colorimetric" as suggested by the Examiner.

**35 USC § 112**

**Claims 1-55** were rejected under 35 USC § 112 as being indefinite. Cancellation of claims 1-55 moots the Examiner's rejection.

**35 USC § 102**

**Claims 1-3, 18-20, 26 and 38-41** were rejected under 35 USC § 102 as being anticipated by Ershov et al (U.S. Pat. No. 5,770,721). Cancellation of claims 1-3, 18-20, 26 and 38-41 moots the Examiner's rejection.

Among other things, new claims 56-71 require a "...multi-functional matrix layer [that] provides reduction of at least one of an autofluorescence of the carrier, an incident-light-absorption of the carrier, and a surface unevenness of the carrier...", which is not taught by Ershov et al. Consequently, new claims 56-71 are not anticipated by Ershov et al.

**35 USC § 103**

**Claims 1-5, 8-13, 16-22, 25-32, 35-43, and 54-55** were rejected under 35 USC § 103 as being obvious over Havens (U.S. Pat. No. 6,306,348) in view of Ershov et al. (U.S. Pat. No. 5,770,721). Cancellation of claims 1-5, 8-13, 16-22, 25-32, 35-43, and 54-55 moots the Examiner's rejection.

New claims 56-71 require a "...multi-functional matrix layer [that] provides reduction of at least one of an autofluorescence of the carrier, an incident-light-absorption of the carrier, and a surface unevenness of the carrier...", which is not taught by either Havens or Ershov. There is also no suggestion or motivation to modify the references' teachings such as to arrive at the subject matter as presently claimed. On the contrary, since Haven's analyte detection is an electronic detection, addition of a matrix layer that reduces autofluorescence, incident light absorption, and/or surface unevenness is entirely superfluous and therefore teaches away from the subject matter as presently claimed.

**Claims 6-7, 14-15, 23-24, 33-34, 44-45, and 52-53** were rejected under 35 USC § 103 as being obvious over Havens (U.S. Pat. No. 6,306,348) in view of Ershov et al. (U.S. Pat. No. 5,770,721) and further view of Chetverin (U.S. Pat. No. 6,001,568). Cancellation of claims 6-7, 14-15, 23-24, 33-34, 44-45, and 52-53 moots the Examiner's rejection.

As outlined above, new claims 56-71 require a "...multi-functional matrix layer [that] provides reduction of at least one of an autofluorescence of the carrier, an incident-light-absorption of the carrier, and a surface unevenness of the carrier...", which is not taught, suggested or motivated by either Havens, Ershov, or Chetverin. There is also no suggestion or motivation to modify the references' teachings such as to arrive at the subject matter as presently claimed. On the contrary, since Chetverin's analyte detection is an in-situ PCR detection, addition of a matrix layer that reduces autofluorescence, incident light absorption, and/or surface unevenness is entirely superfluous and therefore teaches away from the subject matter as presently claimed.

**ATTACHED MARKED-UP VERSION OF CHANGES**

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "VERSION WITH MARKINGS TO SHOW CHANGES MADE".

**REQUEST FOR ALLOWANCE**

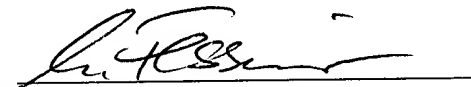
Claims 56-71 are pending in this application. The applicant requests allowance of all pending claims.

Respectfully submitted,

Rutan & Tucker, LLP

Dated: May 21, 2002

By:

  
Martin Fessenmaier  
Reg. No. 46,697

Attorneys for Applicant(s)  
611 Anton Boulevard, Fourteenth Floor  
Costa Mesa, CA 92626-1998  
Tel: (714) 641-5100  
Fax: (714) 546-9035